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SOME RECORDS OF NORTH AMERICAN GEOPHILIDAE
AND LITHOBIIDAE.

With Description of New Species.

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In working over several lots of chilopods from different parts of the country the members of the Lithobiidae and Geophilidae noted below were found. Aside from the addition of new species, there is reported a number of forms not previously recognized since the publication of the original descriptions. A careful examination of a number of species heretofore catalogued under *Himantarium* has shown that these in reality do not belong to *Himantarium* as the genus is now conceived, but to *Haplophilus* Verhoeff. The new records for *Lamyctes fulvicornis* Meinert definitely establish the range of this form entirely across the northern portion of the United States. It appears probable that a second form common in Europe, *Schendyla nemorensis* (C. Koch), will prove to have in the United States approximately the same range as the preceding species, having been previously reported, however, only from New York State.

1. *Schendyla nemorensis* (C. Koch).

1837. *Geophilus nemorensis* C. Koch, *Deutschl. Crustacea, etc.*, Heft 9, Taf. 4.
1866. *Schendyla nemorensis* Bergsøe o. Meinert, *Nath. Tidsskr.* 4 Bd., p. 105.
1880. *Schendyla nemorensis*, Latzel, *Die Myriop. d. Oest.-Ung. Monarchie*, I, p. 198 (which see for the older synonymy.)
1891. *Schendyla nemorensis*, Cook and Collins, *Proc. U. S. N. M.*, p. 386.
1895. *Schendyla nemorensis*, Attens, *Die Myriop. Stiermarks*.

This species, occurring widely over Europe, has previously been reported in America as occurring at Clyde (Cook and Collins) and Staten Island (Underwood), New York. Numerous specimens were found by the author under boards and logs in one particular locality at Provo, Utah, on April 3, 1909. These speci-

mens agree closely in mouth parts and other characters with some from Denmark communicated by Dr. Meinert. Those examined from Provo have either 39 or 41 pairs of legs.

2. ***Pectiniunguis montereus*** Chamberlin.

1904. *Pectiniunguis montereus* Chamberlin, Proc. Acad. Sci. Phil., p. 653.

Additional specimens, partly grown, from the Monterey Bay region, agreeing essentially with the types.

3. ***Pectiniunguis heathii*** sp. nov.

Ultimate article of antennae in length subequal to the two preceding taken together; a little excavated on exterior side near apex.

Cephalic plate longer than wide (as 4.3:3.8); sides widely curved, but little converging caudad; anterior margin subtriangular; posterior margin truncate or weakly curved caudad. Frontal plate not discrete. Prebasal plate not exposed. Basal plate wider than long in ratio 2:1.

Claws of the prehensorial feet when closed attaining front margin of head or nearly so; claws and other joints wholly unarmed; presternum emarginate mesally in front, the shoes of the emargination meeting at an obtuse angle; wider than long (4.6:3).

Anterior praescuta short, the median and posterior of moderate length.

Each of the first ten ventral scuta with a posterior median process fitting into a corresponding pit or depression of the succeeding plate. Ventral pores present on anterior segments in a circular or oval area. Ventral plates of middle region with a longitudinal median sulcus.

Spiracles all circular, the anterior ones small, the posterior ones minute.

Ultimate pair of legs each armed with a claw as in *montereus*, the claw stout.

Last ventral plate wide, narrowed caudad, each side crenately excised near its middle; posterior margin widely weakly incurved.

Pleural pores two on each side, moderate in size and adjacent to the ventral plate.

Anal pores not detected.

Pairs of legs in female type 45.

Length 22 mm.

Locality—Near Cypress Point, Monterey County, Cal. Found in an Indian shell mound some distance below surface. A female dug up at Los Angeles and otherwise agreeing with the type has 53 pairs of legs.

This species is most closely related to the Brazilian *P. plusiococitus* Attems. It is dedicated to Prof. Harold Heath of Stanford University.

4. **Escaryus phyllophilus** Cook and Collins.

1891. *Escaryus phyllophilus*, Cook and Collins, Proc. U. S. N. M., p. 392.

This form was found common under leaves, etc., during the winter months of 1903-04 at Ithaca, N. Y.

5. **Haplophilus laticeps** (Wood).

1862. *Strigamia laticeps*, Wood, Journ. Acad. Sci. Phil., V, p. 49.

1865. *Strigamia laticeps*, Wood, Tr. Am. Phil. Soc., XIII, p. 186.

1886. *Himantarium laticeps*, Meinert, Proc. Am. Phil. Soc., p. 230.

1903. *Himantarium laticeps*, Attems, Zool. Jahrb., XIII, p. 176.

Several specimens from Austin, Texas, (March, 1903, Prof. J. H. Comstock) and from Claremont and Catalina Island, California (C. F. Baker), agreeing fully with Meinert's redescription of Wood's type. Dissection of the mouthparts shows this species like the two following, to belong to *Haplophilus* of Verhoeff.

6. **Haplophilus teniopsis** (Wood).

1862. *Strigamia teniopsis*, Wood, J. Acad. Sci. Phil., V, p. 48.

1865. *Strigamia teniopsis*, Wood, Trans. Am. Phil. Soc., XIII, p. 185.

1886. *Himantarium teniopse*, Meinert, Proc. Am. Phil. Soc., p. 229.

1889. *Himantarium teniopse*, Bollman, Proc. U. S. N. M., p. 211.

1903. *Himantarium teniopse*, Attems, Zool. Jahrb., XIII, p. 177.

Several specimens from Palo Alto, Cal., (writer, and A. J. Carlson), where it seems to be common. Meinert has reported it from San Diego and Bollman from Margarita Island, in the same state.

7. **Haplophilus audacior** sp. nov. Pl. XXVI, figs. 1, 2, 3.

Strongly attenuated both cephalad and caudad; smooth.

Antennae short, flattened, broad at base and conspicuously attenuated distad. The ultimate article a little shorter than the two preceding articles together, narrowing distad, a slight depression near middle of each side.

Cephalic plate clearly wider than long (6:5.3), the anterior margin widely rounded, not emarginate between the bases of the antennae. The sides caudad of the anterior rounded portion first nearly straight or slightly incurved and diverging, then weakly convex and a little converging to the posterior margin which is wide and a little excurved. Frontal plate not discrete. Basal plate about six times wider than long.

Labrum free, medianly deeply emarginate, the free margin with numerous teeth. Mandibles with four pectinate and a single dentate lamellae, the latter with as many as seven moderately long and apically obtuse teeth; in general structure conforming to type of genus. First maxillae with inner branch large but not distinct, the outer branch with second and third segments clearly separated; the coxae or sternum mostly concealed by those of the second maxillae, each

with a short, inconspicuous palpal process; the second article of the outer process with a similar palpus which is in a sub-dorsal position and hence difficult to see. Claw of the palpus of second maxillae large, smooth.

Claws of the prehensorial feet when closed attaining or nearly attaining the front margin of the head; without chitinous lines; unarmed; front margin of pre-sternum widely though but weakly incurved, not mesally emarginate, twice as wide as greatest length, or a little wider.

Anterior and posterior dorsal scuta smooth, entirely unfurrowed, the median scuta somewhat widely depressed each side of middle. Anterior praescuta very short, becoming caudad gradually longer until nearly half as long as the scuta.

Ventral plates all smooth and even, unfurrowed and without depressions. Porigerous area transversely elliptical or oblong, in anterior and middle parts of body sharply demarked and somewhat depressed, the lateral portions sometimes more or less bent caudad, in posterior region becoming more indistinctly defined.

First spiracle large, vertically narrow elliptical, those following circular, gradually decreasing in size caudad.

The first pair of legs decidedly shorter and more slender than the second. Ultimate pair of legs six jointed, not crassate and without a claw.

Last ventral plate narrowed caudad, the sides slightly incurved; posterior margin nearly straight; anterior margin extending forward from each side to the middle line, the border being thus sub-triangular; with a median longitudinal impression. Pleurae with exceedingly numerous small pores over entire surface, ventral, lateral and dorsal, some of the ventral pores being covered by the last ventral plate.

Pairs of legs, 97.

Length 102 mm.; greatest width 3 mm.

Locality—McKendrick, Idaho.

8. *Geophilus bipuncticeps* Wood.

1862. *Geophilus bipuncticeps*, Wood, J. Acad. Sci. Phil. V, p. 45.

1865. *Geophilus bipuncticeps*, Wood, Tr. Am. Phil. Soc., XIII, p. 180.

1886. *Geophilus georgianus*, Meinert, Proc. Am. Phil. Soc. XXIII, p. 218.

1887. *Geophilus perforatus* McNeil, Proc. U. S. N. M., p. 325.

1893. *Geophilus attenuatus*, Bollman, Bull. U. S. N. M., 46, p. 148.

Specimens from Columbus, Ohio, and from Washington, D. C. These have the ventral pores in a transverse band the anterior margin of which is straight, but the area extends caudad at middle on some plates, making the posterior portion subtriangular. The antennae are long, agreeing essentially with Meinert's description for *georgianus*, which is at most a subspecies of the one under consideration. Bollman, who had McNeil's type, regards *perforatus* as a synonym. Because of a seemingly strong tendency for the formation of geographical varieties in

this form, I reserve judgment as to whether *georgianus* and *perforatus* may not represent such until opportunity shall present of examining more material or the types.

9. ***Geophilus attenuatus unaster*** subsp. nov. Pl. XXV, figs. 4, 5, 6.

Widest anteriorly, strongly narrowing caudad over last fourth of length.

General color clear yellow; head darker, chestnut over a transverse area back of frontal region. Antennae uniform yellow. Legs pale yellow. Venter scarcely paler than dorsum.

Antennae short, strongly attenuated from base distad. Uniformly covered with fine short hairs. Last article at apex roundly conical, long, shorter than the two preceding articles together.

Cephalic plate longer than wide (5.2:4); sides straight and subparallel, gradually rounding in to anterior margin, a small but distinct angular process on each side ectad of base of antenna, widely shallowly emarginate between bases of antennae; posterior margin slightly excurved; plate marked with two longitudinal, diverging sulci in front of posterior margin; with sparse, short hairs, scarcely punctate. Basal plate essentially free but prebasal plate not showing; not fully two and a half times wider than long.

Claws of prehensorial feet when closed extending beyond the distal end of the first antennal article. Claw at base with an acute tooth; femur near upper inner angle with a stout blunt tooth, each femur bulging mesad conspicuously adjacent to presternum. Presternum wider than long in ratio of 5.3:4.7; impressed with a longitudinal median line; smooth.

Dorsal scuta bisulcate as usual; mostly smooth. Anterior praescuta short, very gradually increasing in length caudad; moderate in a few segments behind middle, becoming again short posteriorly.

First spiracle large, vertically broadly elliptical, a few following of the same shape, gradually becoming circular caudad; decreasing in size from the second caudad, in the posterior region becoming very small.

Ventral pores in a median longitudinal, lanceolate or ovate area which extends from the posterior margin cephalad and reaches to or extends considerably beyond the middle, the area on the anterior segments more or less sharply demarked but more indefinitely limited in posterior segments.

Last ventral plate wide, attenuated caudad; each side emarginate a little below middle, rounded each side of the emargination, the posterior margin being similarly emarginate mesally. Pleurae moderately enlarged, each with two large pits at the edge of and partly covered by the last ventral plate.

Anal pores evident.

Pairs of legs 63.

Length 44 mm.; width 1.4 mm.; length of antennae 4 mm.

Locality—Austin, Texas (Prof. J. H. Comstock); Louisiana.

10. ***Geophilus deducens*** sp. nov. Pl. XXV, figs. 1, 2, 3.

Gradually attenuated cephalad, more abruptly and strongly so caudad.

Dorsum brown, smoky or blackish along the middle. Venter clear brown. Head and prehensorial feet pale chestnut, the antennae similar. Legs pale yellow.

Antennae short. Articles decreasing in length distad, the ultimate somewhat shorter than the two preceding together.

Cephalic plate longer than wide (4.2:3.7). Posterior margin truncate, anterior margin widely excurved, not mesally emarginate; anterior angles scarcely rounded, the sides caudad of them for about a third of length straight and diverging, then over middle portion straight and subparallel, posteriorly rounding mesad to posterior margin. Roughened posteriorly and laterally. Basal plate about 2.6 times as wide as the median length. Prebasal plate mesally exposed.

Claws of the prehensorial feet when closed extending beyond front of head, attaining the middle of the first antennal article. Claw with a rather pale, short blunt tooth, other joints without teeth. Presternum a little wider than long (5:4.8). Presternum coarsely punctate, the femora nearly smooth or with some finer punctae.

Dorsal scuta bisulcate, some of the anterior ones also with an inner pair of sulci; roughened. Anterior praescuta short, becoming at and caudad of middle moderate-long, not much shortened in posterior segments.

Spiracles all round; the first large, slightly vertically elongate, the third being much smaller and the second intermediate in size; caudad becoming very small.

Anterior ventral scuta with a wide median depression marked with a longitudinal sulcus which does not extend to either the anterior or the posterior border, the depression disappearing on posterior segments and the sulcus becoming longer.

Last ventral plate very wide; the anterior margin on each side extending forward from side to median line, thus forming a broad angle; sides nearly straight, strongly converging, the posterior margin widely excurved. Each pleura with two large pits which are wholly covered by the last plate.

Anal legs rather short, slender, armed with a long claw.

Anal pores not evident.

Pairs of legs 51.

Length 38 mm. Width 1.3 mm. Length of antennae 2.9 mm.

Locality—Sea Cliff, Long Island, New York (N. Banks).

This species is evidently closely related to the *attenuatus* group, although clearly distinct.

11. ***Geophilus atopleurus*** sp. nov. Pl. XXIV, figs. 1, 2, 3.

Strongly attenuated cephalad, caudad more abruptly narrowed.

Light, somewhat olivaceous, brown. Head, prehensorial feet and antennae orange. Legs pale yellow. Venter a little paler than the dorsum.

Articles of the antennae very gradually decreasing in length distad, the ultimate shorter than the two preceding together.

Cephalic plate a little longer than broad (12:11). Lateral halves of anterior margin running cephalad to meet at an angle on the mesal line. Back of each anterior angle the side is first weakly convex and the concave at end of frontal suture; back of this the sides are nearly straight and parallel, caudally rounding in to the wide posterior margin which is weakly concave. Head marked in front of the posterior margin with two diverging sulci. Frontal plate discrete. Prebasal plate exposed mesally. Basal plate 2.4 times wider than mesal length.

Claws of prehensorial feet when closed attaining the front margin of cephalic plate or but little short of it. Tooth on claw very obscure or obsolete, no trace of one on other joints. Presternum and femora punctate.

Dorsal scuta sharply impressed with the usual two sulci, which lie rather close to the median line, some with a more indistinct median sulcus. Anterior prescuta short, becoming very long at and caudad of the middle; not much shortened on posterior segments, long.

First spiracle large, circular or a little obliquely elongate; others circular from the second caudad decreasing gradually but not strongly.

A median process on posterior margin of the second to sixteenth ventral plates fitting into a corresponding pit or excavation in anterior margin of succeeding plate. Ventral pores in a transverse band a little in front of the posterior margin. Sterna with a median longitudinal sulcus which in anterior segments is short and sharply impressed but on posterior segments extends over full length of scuta and is crossed in some by one or more rather indefinite sulci.

Last ventral plate wide; anterior angles rounded; sides somewhat excurved and strongly converging to the conspicuously rounded posterior margin. Pleurae moderately inflated; each with about eighteen pores on each side arranged along and partly beneath the ventral plate and along the presterna and with four or five on dorsal side near and beneath the dorsal plate; on the ventral surface caudo-laterad from the posterior pores a peculiar chitinous mark in a position in some species occupied by an isolated pore.

Last legs a little enlarged; armed with a large claw.

Anal pores distinct.

Pairs of legs 55 (?).

Length 39 mm. Width 1.4 mm. Length of antennae 3 mm

Locality—Raleigh, North Carolina (Brimley, 1901).

Belonging in the mordax group of species with *virginiensis* Boll. and *louisianae* Brol.

12. ***Geophilus rubens* Say.**

1821. *Geophilus rubens*, Say, Journ. Acad. Sci. Phil., II, p. 21.
 1862. *Geophilus cephalicus*, Wood, Journ. Acad. Sci. Phil., p. 44.
 1862. *Geophilus laevis*, Wood, Jour. Acad. Sci. Phil., V, p. 44.
 1865. *Geophilus cephalicus*, Wood, Trans. Am. Phil. Soc., XIII, p. 178.
 1865. *Geophilus laevis*, Wood, Ibid., p. 180.
 1865. *Strigamia rubens*, Wood, Ibid., p. 182.
 1888. *Geophilus rubens*, Bollman, Proc. U. S. N. M., XI.
 1893. *Geophilus rubens*, Bollman, Bull. U. S. N. M., 46, p. 148.
 1896. *Geophilus rubens*, Brolemann, Ann. Soc. Ent. de France, p. 53.

Several specimens from Michigan (Ann Arbor, etc.), and two, representing a variety, from Pacific Grove, Cal.

13. ***Geophilus smithii* Bollman.**

1888. *Geophilus smithii*, Bollman, Proc. U. S. N. M., XI, p. 347.
 1888. *Geophilus smithii* Bollman, Ibid., p. 498.

Four specimens from Washington, D. C., the type locality.

14. ***Geophilus legiferens* sp. nov.** Pl. XXIV, figs. 4, 5, 6.

Almost of uniform width over the anterior and middle portions, attenuated caudad.

Pale orange in general color; head and presternum light chestnut; dorsum darkened in mesal region; antennae pale orange; legs pale yellow.

Antennae moderate in length; the articles gradually decreasing in length distad, the ultimate apically rounded and clearly shorter than the two preceding taken together.

Cephalic plate longer than wide in the ratio of 4:3. Anterior and posterior margins substraight or but little excurved, the former slightly and widely emarginate between bases of antennae. Anterior portion of sides rounded cephalo-mesad from frontal suture. Sides from a little back of ends of frontal suture sub-straight, slightly converging and posteriorly rounding inward to caudal margin. Front 1 plate discrete. Prebasal plate not exposed. Basal plate a little less than three times wider than the median length.

Claws of prehensorial feet when closed reaching the front margin of the head. Claws obscurely dentate at base, other joints unarmed.

Anterior prescuta short, becoming moderately long in the middle region and intermediate in size in the posterior portion.

Anterior spiracle large, vertically widely elliptical, others circular, the second intermediate in size, gradually decreasing in size from the third caudad.

First legs shorter and decidedly more slender than the second. Ultimate legs very long, slender, armed with a large claw.

Sterna uniformly punctate. Ventral pores on anterior sterna few, in a small median patch just in front of the posterior margin. Anterior sterna mesally widely depressed, marked with a longitudinal median sulcus.

Last ventral plate long, moderate anteriorly, narrowing decidedly caudad, the sides weakly excurved. Posterior margin of plate straight.

Last pleurae each with about twenty-five pores on ventral and lateral surfaces and a few on dorsal, the pores aggregated chiefly over cephalic portion, especially in the case of those lateral and dorsal in position. Two or three pores covered by dorsal plate and four or five by the ventral. The ventral pore most caudad in position is somewhat isolated from the others but is not enlarged or but slightly so.

Anal pores present.

Pairs of legs 61.

Length 38 mm. Width 1.2 mm. Length of antennae 3 mm.

Locality—Washington, D. C.

15. ***Geophilus marginalis*** Meinert.

1886. *Geophilus marginalis*, Meinert, Proc. Am. Phil. Soc., XXI, p. 218.

A specimen from Miami, Florida, collected by Prof. J. H. Comstock in 1903 agrees closely with the description of Meinert's individual, which likewise came from Florida.

16. ***Geophilus nasintus*** sp. nov. Pl. XXIV, figs. 7, 8, 9.

Body gradually attenuated cephalad, more abruptly so caudad.

General color light yellow, inclining to greyish at middle portion both above and below. Head, presternum and antennae darker, uniform.

Antennae long. Articles all long and distad of the second not much differing in length.

Cephalic plate longer than wide in the ratio of 6:4.8. Posterior margin subtruncate; anterior angles widely rounded, front margin rounded forward, mesally not at all emarginate; the sides weakly convex more strongly so posteriorly; posterior margin a little incurved; head wider behind than in front. Posterior lateral portion of cephalic plate subdensely punctate somewhat less densely so over median posterior portion, the punctate rather fine; frontal region almost free from punctae; frontal plate not discrete. Basal plate three times as wide as long, rather sparsely finely punctate. Prebasal plate not exposed.

Claws of prehensorial feet when closed attaining front margin of cephalic plate. Claw and other joints entirely without teeth. Presternum nearly smooth.

Dorsal scuta with rather weak lateral sulci, a median longitudinal sulcus also evident on some; sulci scarcely evident on posterior segments. Anterior prescuta moderate in length, becoming rather long in the third quarter of the body and then decreasing in size caudad.

All spiracles round, the first large and the second abruptly smaller.

Ultimate legs in the female long, moderately enlarged, armed with a claw.

Ventral plates or sterna with a longitudinal sulcus which is deepest at middle portion of its length, where on some segments, it is crossed at right angles by a transverse sulcus. Ventral pores in a transverse band adjacent to posterior margin.

Last ventral plate narrow, the sides converging posteriorly and the posterior margin straight. Pleural pores situated ventrally and laterally; a few covered by the last plate and one somewhat isolated caudo-laterad from the others of the ventral group; sixteen or eighteen in number.

Anal pores not evident.

Pairs of legs 73.

Length 42 mm. Width 1.1 mm., nearly.

Locality—Not definite, but probably California (southern portion, if so). One specimen.

17. ***Geophilus claremontus*** sp. nov. Plate XXV, figs. 7, 8, 9.

Scarcely attenuated anteriorly; abruptly narrowed caudad.

Cephalic plate longer than wide in ratio of 2.7:2; about equal in width anteriorly and posteriorly; anterior and posterior angles widely rounded; posterior margin subtruncate or very weakly excurved; middle portion of lateral margins straight or but slightly excurved. Marked with two longitudinal and diverging sulci in front of posterior margin. Punctate with coarse and fine punctae, the middle portion of frontal plate free from such punctae or nearly so. Frontal plate discrete. Portion of the basal plate uncovered by the cephalic 2.6 times wider than long.

Claws of prehensorial feet when closed extending to middle of second antennal article. Feet armed on each side with four teeth, that on the claw longest, truncate; that on the femur broad but low, rounded, the other two similar but smaller. Presternum wider than long (4.8:4.5); anterior margin widely emarginate, the emargination shallow; marked with a median longitudinal sulcus.

Dorsal scuta strongly bisulcate; punctate. Anterior prescuta short; prescuta back of the middle becoming moderate and then decreasing, the ultimate being very short.

First spiracle large, sub-circular, being a little elongate vertically. Other spiracles circular, the third much smaller than the first and the second intermediate in size; others gradually decreasing in size from the third caudad.

First pair of legs decidedly shorter and more slender than the second. Ultimate legs slender, armed with a claw.

Ventral pores not detected.

Last ventral plate moderate; narrowing caudad; sides a little excurved as is also the posterior margin. Pleural pores ventral in position; the one most posterior in position somewhat isolated from the others; about fifteen on each side, an inner row of them being covered by the last plate.

Pairs of legs 65.

Length ad 40 mm. Width ad 1.2 mm.

Locality—Claremont, Cal.

One specimen. Apparently related rather closely to *legiferens* sp. nov.

18. ***Geophilus glaber*** Bollman.1887. *Geophilus glaber*, Bollman, Entom. Americana, II, p. 229.

Pacific Grove and Shasta Springs, Cal. (writer). Common at Portland, Oregon, (writer) and at Pullman, Washington (Mann).

At Shasta Springs a female was taken in August in a pit on the under surface of a log with the body coiled about her numerous young.

19. ***Geophilus occidentalis*** Meinert.1886. *Geophilus occidentalis*, Meinert, Proc., Am. Phil. Soc., p. 220.

One specimen of this species taken at Pacific Grove, Cal., in June, 1902, and numerous specimens at this place and adjacent parts in 1909; also at Saucilito (writer).

20. ***Geophilus regnans*** Chamberlin.1904. *Geophilus regnans*, Chamberlin, Proc. Acad. Sci. Phil., p. 654.

Many additional specimens from southern California (Claremont, Catalina Island, Los Angeles).

21. ***Geophilus isantus*** sp. nov. Pl. XXVI. figs. 7, 8, 9.

Ferruginous, becoming brown posteriorly; the head and prehensorial feet darker. Legs yellow. Antennae dark, yellowish distally. Venter ferruginous anteriorly, becoming yellow caudad. Smooth and shining.

Body uniform in width anteriorly or nearly so, but attenuated caudad.

Cephalic plate much longer than wide (4.5:3), wider anteriorly than behind; anterior and posterior margins truncate, angles rounded, the gently converging sides nearly straight; anterior margin not mesally emarginate. Frontal plate not discrete. Basal plate strongly narrowed cephalad, posterior margin 2.7 times as wide as the exposed portion is long.

Claws of prehensorial feet when closed extending a little beyond front margin of head. Femur with a blunt black tooth as also each of two joints distad from it; with a smaller one claw with a tooth at base which is truncate apically. Presternum acutely emarginate mesally at anterior border.

Antennae subfiliform, but slightly tapering distad, articles all moderately long, not much slanting toward apex, the ultimate but little longer than the penult, apically pointed. More than 2.5 times as long as cephalic plate.

First spiracle large, vertically suboval, the second abruptly smaller, circular, those following gradually and but slightly becoming smaller.

Anterior ventral plates mesally sulcate. Ventral pores not detected.

Last ventral plate longer than wide (nearly as 3.5:2.8), behind middle bent gently dorsad. Last coxae with four pores arranged at the corners of a quadrangle and three pores covered by the edge of the ventral plate on each side.

Anal pores covered.

First pair of legs shorter and a little more slender than the second. Anal legs crassate, seven jointed, the ultimate article unarmed, somewhat tapering distad, whereas the others are more or less obconic.

Pairs of legs 87. Length 40 mm., width 1.1 mm. Antennae 4.4 mm. long.

Locality—Los Angeles, Cal.

22. *Linotenia bidens* (Wood).

1862. *Strigamia bidens*, Wood, Jour. Acad. Sci. Phil., V, p. 47.
 1865. *Strigamia bidens*, Wood, Tr. Am. Phil. Soc., XIII, p. 183.
 1888. *Linotenia bidens*, Bollman, Proc. U. S. N. M., XI, p. 34.
 1896. *Scolioplanes bidens*, Brolemann, Ann. Soc. Ent. de France, p. 58, Pl. 6, figs. 10-13.

One specimen from Raleigh, North Carolina. (Brimley, 1901.)

23. *Linotenia fulva* (Sager).

1856. *Strigamia fulva*, Sager, Proc. Phil. Acad. Sci., p. 109.
 1862. *Strigamia bothriopa*, Wood, Jour. Acad. Sci. Phil., V, p. 47.
 1865. *Strigamia bothriopa*, Wood, Tr. Am. Phil. Soc. XIII, p. 183.
 1886. *Scolioplanes bothriopus*, Meinert, Proc. Am. Phil. Soc., XXI, p. 223.
 1888. *Linotenia fulva*, Bollman, Proc. U. S. N. M., XI, p. 341. Etc.

Numerous specimens from the vicinity of lakes Cayuga, Seneca and Keuka, New York (writer, 1903, 1904); Long Island, New York; Michigan (several specimens).

24. *Linotenia chionophila* (Wood).

1862. *Strigamia chionophila*, Wood, Journ. Acad. Sci. Phil., V, p. 50.
 1865. *Strigamia chionophila*, Wood, Tr. Am. Phil. Soc., XIII, p. 189.
 1886. *Scolioplanes chionophilus*, Meinert, Proc. Am. Phil. Soc., XXI, p. 223.
 1888. *Linotenia chionophila*, Bollman, Proc. U. S. N. M., XI, p. 346.
 1896. *Scolioplanes chionophilus*, Brolemann, Ann. Soc. Ent. de France, p. 60.

Rather common at Ithaca, N. Y., and vicinity (writer); one specimen from mouth of Mammoth Cave, Ky.; one specimen in bad condition but apparently this species from Texas.

25. *Linotenia levipes* (Wood).

1862. *Strigamia laevipes*, Wood, Journ. Acad. Sci. Phil., V, p. 48.
 1865. *Strigamia laevipes*, Wood, Tr. Am. Phil. Soc., XIII, p. 184.

A number of specimens of this species from Catalina Island, Cal. Numerous specimens from Los Angeles and Pacific Grove, occurring in damp soil some distance below the surface.

26. **Linotenia rubelliana** Chamberlin.

1904. Proc. Acad. Sci. Phil. p. 656.

Additional specimens, adults and partly grown, from the Monterey Bay region, Cal.; also at Santa Barbara.

27. **Lithobius pusio** Stuxberg.1875. *Lithobius pusio*, Stuxberg, *Ofvers. af Kgl. Vet. Akad. Forhandl.*, No. 2, p. 67; No. 3, p. 31.

Claremont, California. Reported originally from San Francisco.

28. **Lithobius obesus** Stuxberg.1875. *Ofvers. af. Kgl. Vet.-Akad. Frohandl.*, No. 2, p. 67; No. 3, p. 31.

Specimens from Catalina Island and Claremont, Cal. (C. F. Baker); Laurel Canyon, Los Angeles, and Monterey, Cal. (writer).

29. **Lithobius kochii** Stuxberg.1875. *Ofvers. af. Kgl. Vet.-Akad. Forhandl.* No. 2, p. 68; No. 3, p. 30.1887. *Lithobius kochii*, Bollman, *Proc. U. S. N. M.*, X, p. 255.

Pacific Grove and Claremont, Cal.; Salina, Colorado (Cockerell).

The specimens from Colorado agree with a specimen recorded from that state by Bollman in having the spines of the first legs 1, 1, 1 as against 0, 1, 1 in those from California. Upon the basis of Bollman's statement of this difference Cockerell has proposed for the Col. form the varietal name *coloradensis*.

30. **Lithobius paradoxus** Stuxberg.1875. *Ofvers. af. Kgl. Vet. Akad. Forhandl.*, No. 2, p. 67; No. 3, p. 31

A specimen from Claremont, Cal.

31. **Lithobius utahensis** Chamberlin.1901. *Proc. U. S. N. M.*, p. 159.

Common at Pacific Grove, and (writer), Shasta Springs, Cal., and at Portland, Oregon (writer).

32. **Lithobius clavigerens** Chamberlin.1903. *Proc. Acad. Sci. Phil.*, p. 159.

Specimens from Claremont and Catalina Island, Cal. Apparently common along the entire California coast.

33. **Lithobius ginampus** sp. nov.

Dorsum brown to chestnut, with rather faint darker median stripe; the head darker; antennae colored like the head at base, distally be-

coming rufous; legs brown, distal joints paler; ventral plates brown, uniform; presternum reddish brown.

The body conspicuously narrowing from the tenth dorsal plate forward.

None of the dorsal plates truly produced, with the angles of the eleventh and thirteenth but weakly extended.

Antennae short; articles twenty-one, these gradually decreasing in length from the base to the distal one.

Ocelli on each side ten, arranged in three series (1+4, 3, 2.)

Presternal teeth 2-2.

Coxae of last three pairs of legs armed above, those of the last two pairs also laterally. Anal legs with the claw unarmed, spines 1, 3, 3, 1. Penult legs have the claw armed with two spines of which the anterior one is sub-ventral in position and easily overlooked; spines 1, 3, 3, 2. Spines of the first legs 1, 3, 2.

Coxal pores round, moderate in size, 3, 4, 4, 3.

Anal legs of the male a little crassate but less so than the penult. The penult legs have the first tarsal segment strongly inflated and bearing above at the distal end a conspicuous, short, keel shaped process.

Length 15.4 mm. Width of tenth plate 2 mm. Length of antennae 3.6 mm. anal legs short.

Locality—Pullman, Washington (Mann).

The types consist of several males.

34. *Lithobius tivius* sp. nov.

Dorsum brown, the posterior margins of some scuta bordered with a somewhat obscure, transverse dark band; head yellowish or yellow-brown, often of a reddish tinge; antennae dark over the basal portion, becoming lighter distally, rufous apically; legs yellowish brown, the posterior pairs darker; venter paler than dorsum, its posterior plates and also the presternum of rufous caste.

Angles of none of the dorsal plates produced.

Antennae short; articles thirty-one or thirty-two, the first two articles long, the others, excepting the ultimate, very short.

Ocelli on each side seven or eight, arranged in two series (1+3, 3 or 1+4, 3).

Presternal teeth 2-2, moderately large and distinct, darkened.

None of the posterior coxae armed laterally or dorsally. Claw of each anal leg armed with a single spine; spines 1, 3, 2, 0; moderately crassate. Penult legs with the claw armed with two spines; spines 1, 3, 3, 0. Spines of the first legs 0, 1, 1.

Claw of the female gonopods trilobed, the lobes mostly short and obtuse, the outside one distinctly smallest; basal spines 2-2, short and stout.

Length 8 mm. Length of antennae 2.2 mm. Anal legs short.

Locality—Pullman, Washington, and Salt Lake City and Provo, Utah.

This species seems to lie closest to *Lithobius exiguus* Meinert, found in New York. In Utah, the new form is commonest under the bark of decaying logs.

35. ***Lithobius sokovus*** sp. nov.

General color of body and legs above and beneath pale yellow to yellowish white; praesternum and prehensorial feet, and head light brown; antennae light brown to yellow.

Angles of none of the dorsal plates produced.

Head subcordiform, about equal in length and breadth.

Antennae with 19 articles, which are short, the ultimate in length about equalling the two preceding together.

Ocelli 8 in number, arranged in two series (1+4, 3), decreasing in size in each series from most posterior to the anterior one.

Presternal teeth 2-2, very small, brown in color.

Anal legs with claw unarmed; spines 1, 3, 2, 0. Penult legs with claws each armed with a single spine. Spines of first legs 1, 2, 1.

Coxal pores small, round, 1, 2, 2, 2.

Male: femur of anal legs near middle of dorsal or dorso-mesal surface with a knot-like elevation, somewhat expanded at distal end in contact with the tibia. Tibia with a ridge-like elevation extending for entire length along the dorso-mesal surface, this extended at proximal end into a rounded lobe much as in *clavigerens*, the lobe bearing a spine which is curved caudad at its distal end.

Female: claw of gonopods tripartite; basal spines 2-2.

Locality—Las Vegas, Nevada. In loose soil from six inches to a foot below the surface.

36. ***Lithobius bonvillensis*** sp. nov.

Dorsum from light to blackish brown, the posterior border of most of the major plates usually lighter; head paler, brown or light brown, sometimes with a darker median area caudad of the frontal suture; antennae brown to blackish, yellowish or rufous distally; praesternum and feet concolorous with head; venter light brown to yellowish, the first and the last plates darkest; legs yellowish, the last few pairs sometimes darker.

Angles of none of dorsal plates produced.

Head a little wider than long (as 3:2.9).

Antennae short; the first two articles long, others short, closely crowded; articles 29 in number.

Ocelli 8-9, moderate in size, arranged in two series (1+4, 3 or 1+5, 3).

Praesternal teeth 2-2, small, scarcely darkened.

Posterior coxae unarmed above, laterally or beneath. Anal legs with the claws each armed with two spines; spines 1, 3, 2, 0. Penult legs with the claws each armed with two spines; spines 1, 3, 2, 1. Spines of first legs 0, 0, 1.

Coxal pores small, round, the distal ones in each series largest 3, 4, 4, 4.

Gonopods of female with the claw tripartite, the lobes short and blunt, the outermost usually less developed than the innermost, basal spines 3-3, decreasing in size from outermost to innermost on each side, each spine conically pointed.

Locality.—Lake Point, Utah. Under stones along foothills

37. **Lithobius monticola** Stuxberg.

1875. Ofvers. af Kgl. Vet. Akad., No. 2, p. 65; No. 3, p. 30.

Several specimens from Hayward, Cal.

38. **Lithobius sierravagus** Chamberlin.

1903. Proc. Acad. Sci. Phil., p. 154.

Pullman, Washington, common (Mann).

39. **Lithobius xanti** (Wood).

1862. Bothropolys xanti, Wood, Journ. Acad. Sci. Phil. V, p. 15.

1865. Bothropolys xanti, Wood, Tr. Am. Phil. Soc., XIII, p. 152.

1875. Lithobius xanti, Stuxberg, Ofvers. af Kgl. Vet.-Akad., No. 3, p. 27.

1887. Lithobius xanti, Bollman, Proc. U. S. N. M., X.

Common at Pacific Grove, Los Angeles, Santa Barbara, San Bernadino, etc., Cal. (writer).

40. **Lithobius multidentatus** Newport.

1845. Linn. Soc. Tr. XIX, p. 365.

1862. Bothropolys mobilis, Wood, Journ. Acad. Sci. Phil., V, p. 15.

1865. Bothropolys multidentatus, Wood, Tr. Am. Phil. Soc., XIII, p. 152

Chapel Hill, North Carolina; Virginia; Washington, D. C.; Michigan; Ithaca, Penn Yan, etc. New York. Common in all these localities.

41. **Lithobius celer** Bollman.

1888. L. Entom. Americana, IV.

One specimen, agreeing fully with the description of this species from Michigan.

42. **Lithobius mordax** L. Koch.

1862. Die Myriopodengattung Lithobius, p. 34.

Specimens from Louisiana.

43. **Lithobius forficatus** (Linnaeus).

1758. Scolopendra forficata, Linnaeus, Syst. Nat., I, p. 638

1815. Lithobius forficatus, Leach, Tr. Linn. Soc., XI.

1821. Lithobius spinipes, Say, Journ. Acad. Sci. Phil., II, p. 108.

1845. Lithobius americanus, Newport, Tr. Linn. Soc., XIX, p. 365.

1862. Lithobius americanus, Wood, Journ. Acad. Sci. Phil., V, p. 14.

1865. Lithobius americanus, Wood, Tr. Am. Phil. Soc., XIII, p. 148.

1875. Lithobius forficatus, Stuxberg, Ofvers. af Kgl. Vet. Akad. Forhandl., etc.

In and about cities and towns of northern Utah (Logan, Ogden, Salt Lake City, Provo, etc. (writer); Pocatello, Idaho (writer).

In Utah I have not found this species away from populated districts.

44. **Lithobius bipunctatus** (Wood).

1862. *Bothropolys bipunctatus*, Wood, Journ. Acad. Sci. Phil., V, p. 16.

1865. *Bothropolys bipunctatus* Wood, Tr. Am. Phil. Soc. XIII, p. 153.

1875. *Lithobius bipunctatus*, Stuxberg, Ofvers. af Kgl. Vet.-Akad. Forhandl., No. 3, p. 30.

1901. *Lithobius bipunctatus*, Chamberlin, Proc. U. S. N. M., p. 22.

Eastern slope of Wahsatch Mts., Uintah Mts., and Oquirrh Mts. (Clinton's Cave), Utah (writer).

45. **Lithobius hoples** Brolemann.

1896. Ann. Soc. Ant. de France, p. 45.

Three males of this species from Portland, Oregon (writer).

46. **Lithobius paucidens** Wood.

1862. Journ. Acad. Sci. Phil., V, p. 14.

1865. *Lithobius paucidens*, Wood, Tr. Am. Phil. Soc., XIII, p. 151.

Specimens from Los Angeles, Santa Monica, Laurel Canyon, and San Bernadino, Cal.

47. **Lithobius harrietae** Chamberlin.

1906. Proc. Acad. Sc. Phil., p. 3.

Several specimens from Salina, Colorado (Cockerell).

48. **Lithobius aztecus** Humbert and Saussure.

1869. Rev. et Mag. de Zool., p. 156.

1872. Etudes sur les Myriop., p. 116.

Specimens from Tuxpan and Guadalajara, Mexico.

49. **Lamyctes fulvicornis** Meinert.

1872. Naturhistorisk. Tidsskrift, 3rd. R., V, p. 267.

1880. *Henicops fulvicornis*, Latzel, Die Myriop. I, p. 133. etc.

Lake Point, Utah; Portland, Oregon; Pocatello, Idaho; Las Vegas, Nevada (writer).

EXPLANATION OF PLATES.

Plate XXIV.

***Geophilus atopleurus* sp. nov.**

- Fig. 1. Ventral view of anterior portion.
 Fig. 2. Ventral view of posterior portion.
 Fig. 3. Dorsal view of anterior portion.

***Geophilus legiferens* sp. nov.**

- Fig. 4. Ventral view of posterior portion.
 Fig. 5. Ventral view of anterior portion.
 Fig. 6. Dorsal view of anterior portion.

***Geophilus nasintus* sp. nov.**

- Fig. 7. Dorsal view of anterior portion.
 Fig. 8. Ventral view of anterior portion.
 Fig. 9. Ventral view of posterior portion.

Plate XXV.

***Geophilus deducens* sp. nov.**

- Fig. 1. Ventral view of anterior portion.
 Fig. 2. Ventral view of posterior portion.
 Fig. 3. Dorsal view of anterior portion.

***Geophilus attenuatus unaster* subsp. nov.**

- Fig. 4. Ventral view of posterior portion.
 Fig. 5. Ventral view of anterior portion.
 Fig. 6. Dorsal view of anterior portion.

***Geophilus claremontus* sp. nov.**

- Fig. 7. Dorsal view of anterior portion.
 Fig. 8. Ventral view of posterior portion.
 Fig. 9. Ventral view of anterior portion.

Plate XXVI.

***Haplophilus audacior* sp. nov.**

- Fig. 1. Ventral view of prehensorial feet.
 Fig. 2. Ventral view of posterior portion.
 Fig. 3. Dorsal view of anterior portion.

***Geophilus isantus* sp. nov.**

- Fig. 7. Dorsal view of anterior portion.
 Fig. 8. Ventral view of posterior portion.
 Fig. 9. Ventral view of anterior portion.